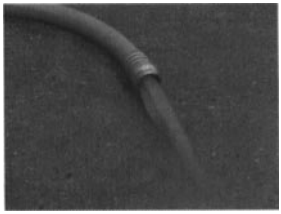
COLLECTING SOURCE WATER SAMPLES

When you are ready to collect your protozoa sample, bring the following items with you to the sampling location:

- ❑ Shipping container sent by the laboratory
- ❑ Sampling apparatus
- ❑ Plastic sample bags
- ❑ Sample labels
- ❑ Frozen ice packs
- ❑ Several pairs of new latex gloves
- ❑ pH meter
- ❑ Thermometer
- ❑ Turbidimeter

If you will be collecting samples from both source water and finished water on the same day, perform the finished water sampling first. Using the sampling apparatus on source water first may cause false positives for finished water sample analyses.

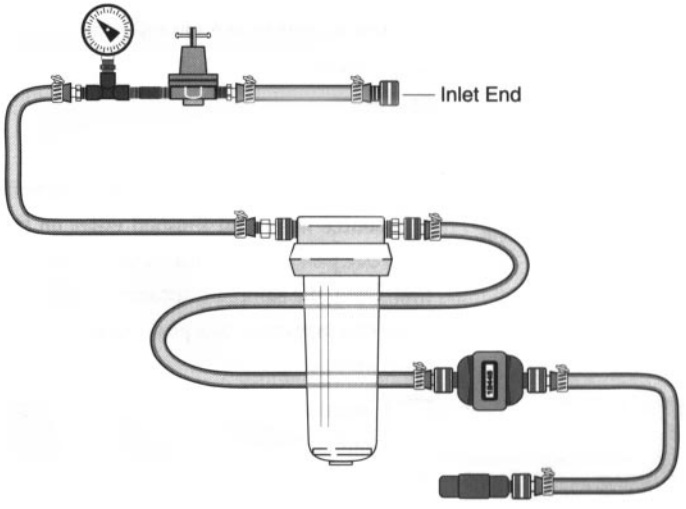


Turn on the water at the tap and allow the water to flow for 2 to 3 minutes or until any debris that has accumulated in the sampling line has cleared or the turbidity in the water becomes uniform.

Turn off the water at the tap.

STEP 4 Put on new latex gloves to prevent contamination from outside sources. Sterile technique must be used when sampling for *Giardia* and *Cryptosporidium*. Any contamination of the sampling apparatus may bias the final results.

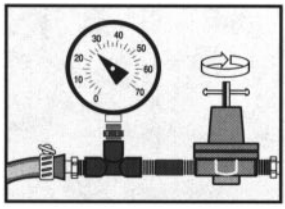
Assemble the sampling apparatus as shown below and connect the inlet end of the sampling apparatus to the sampling tap or to an extension hose connected to the tap.



Be sure that the filter housing does *not* contain the filter.

Note the water meter reading, then slowly turn on the water.

5 Using the pressure regulator, adjust the water pressure to no more than 30 psi. Flush the sampling apparatus with 20 gallons/ 76 liters of water by allowing the water to flow through the system and out the effluent hose.



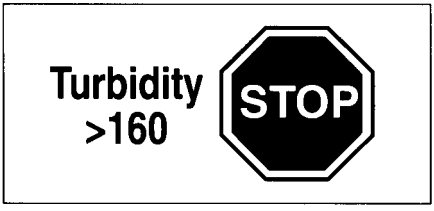
Sampling Step	Volume In GALLONS	Volume In LITERS	Volume In FT^3
System Flush	20	76	2.7

While the water is flushing the sampling apparatus, begin completing your sample label. Record the following information:

- Sampler's name
- Date
- Sample location

Stop Time:_____ Meter Reading:_____ Turbidity:_____
Start Time:_____ Meter Reading:_____ Turbidity:_____
Operator Name:_____ Total Volume Filtered:_____
Date:_____ Sampling Location:_____

6 Measure the turbidity of the source water flowing from the effluent hose. Record the readings on the sample label. If the turbidity is greater than 160 Nephelometric Turbidity Units (NTU), sampling should be rescheduled for a day when the turbidity is lower.



STEP 7 After the system has been flushed with 20 gallons / 76 liters of water, turn off the tap and disconnect the inlet and outlet hoses from the filter housing.

Using the filter wrench, open and drain the filter housing.

Open the filter packaging as aseptically as possible and carefully drop the filter into the filter housing.

Be sure to hold the loose gasket in place using aseptic technique.

Reassemble the filter housing, and reconnect the inlet and outlet hoses. Place the filter housing in an upright position.

Slowly, turn on the tap and start the water flowing through the sampling apparatus.

Using the pressure regulator, adjust the pressure to no more than 30 psi.

Record the following information on the sample label:

- Time sampling started
- Initial water meter reading (including units)
- Turbidity

Stop Time:_____ Meter Reading:_____ Turbidity:_____
Start Time:_____ Meter Reading:_____ Turbidity:_____
Operator Name:_____ Total Volume Filtered:_____
Date:_____ Sampling Location:_____

Monitor the water meter to ensure that the flow rate does not exceed 1 gallon/min (approximately 4 liters/min).

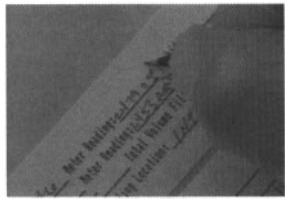
8 Allow at least 26 gallons/100 liters of water to pass through the filter. At a flow rate of approximately 1 gallon/minute, this will require about 30 minutes.

Sampling Step	Volume In GALLONS	Volume In LITERS	Volume In FT^3
Protozoa Flow Rate	1 per minute	4 per minute	.13 per minute
Protozoa Source Water Sample	26	100	3.5

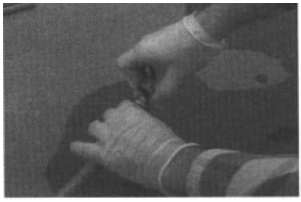
9 When the water meter indicates that 26 gallons/100 liters of water have passed through the filter, turn off the water at the tap.

Record the following information on the sample label:

- Time sampling stopped
- Final water meter reading (including units)
- Final turbidity
- Total volume filtered



Stop Time:_____ Meter Reading:_____ Turbidity:_____
Start Time:_____ Meter Reading:_____ Turbidity:_____
Operator Name:_____ Total Volume Filtered:_____
Date:_____ Sampling Location:_____

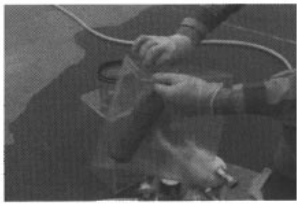


STEP 10 Disconnect the sampling apparatus from the water tap.

Be sure to hold the inlet hose *above the level of the outlet hose opening* while the water drains from the housing. This will prevent backwash and loss of particulate matter from the filter.

Disconnect the inlet and outlet hoses from the filter housing.

Put on fresh latex gloves.



STEP 11 As aseptically as possible, remove the filter from the housing and put it into a plastic sample bag.

STEP 12 Pour all of the water remaining in the filter housing into the same plastic bag.

STEP 13 Seal the plastic sample bag and place it inside the second plastic sample bag. Transfer the label or label information to the outside of the outer bag.

STEP 14 Put the bags containing the filter into the shipping container. Place the ice packs around, but not on, the sample bag to prevent freezing the sample. You may want to insert several inflated, empty sample bags between the sample and the ice packs.

STEP 15 Seal the container and follow the laboratory's instructions related to the cleaning, storage, and return of sampling equipment.

STEP 16 Ship the container by overnight courier to the laboratory. Call the laboratory and notify them of the sample shipment.

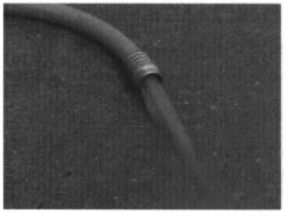
COLLECTING FINISHED WATER SAMPLES

If *Giardia* or *Cryptosporidium* concentrations in your source water samples exceed 1 per liter during the first 12 months of sampling, then you must monitor finished water as well as source water. If you are required to collect samples from both, collect the finished water sample first, then the source water sample.

Receiving and verifying the contents of your sampling kit are addressed in **STEPS 1** and **2** of the source water sampling section.

When you are ready to collect your finished water protozoa sample, bring the following items with you to the sampling location:

- ❑ Shipping container sent by the laboratory
- ❑ Sampling apparatus
- ❑ Fluid proportioning injector (for adding 2% thiosulfate solution to neutralize effects of chlorination or other disinfectant treatments)
- ❑ Plastic sample bags
- ❑ Sample labels
- ❑ Frozen ice packs
- ❑ Several pairs of new latex gloves
- ❑ Approximately 2 gal (4 L) of 2% sodium thiosulfate solution
- ❑ Sterile, 250- or 500-mL graduated cylinder
- ❑ Thermometer

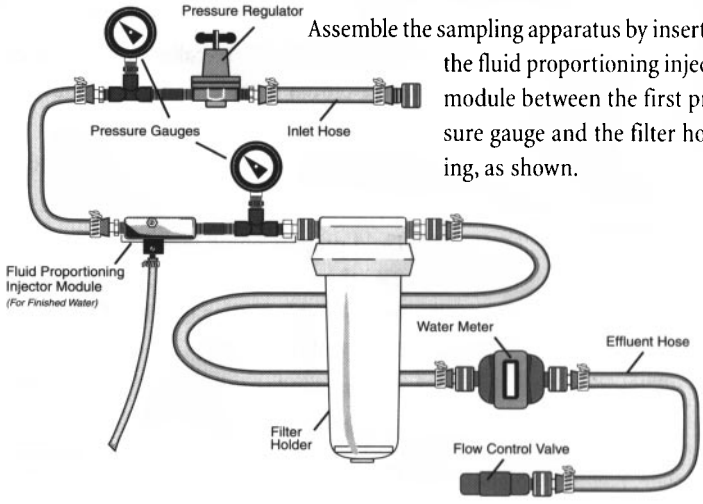


STEP 3 Turn on the water at the tap and allow the water to flow for 2 to 3 minutes or until any debris that has accumulated in the sampling line has cleared or the turbidity in the water becomes uniform.

Turn the water off at the tap

STEP 4 Put on new latex gloves to prevent contamination from outside sources. Sterile technique must be used when sampling for *Giardia* and *Cryptosporidium*. Any contamination of the sampling apparatus may bias the final results.

Assemble the sampling apparatus by inserting the fluid proportioning injector module between the first pressure gauge and the filter housing, as shown.

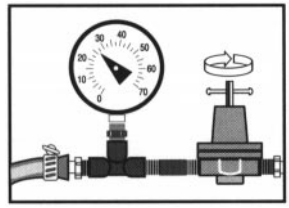


Connect the inlet end of the sampling apparatus to the sampling tap or to an extension hose connected to the tap.

Be sure that the filter housing does NOT contain the filter.

Note the water meter reading, then slowly turn on the water.

STEP 5 Using the pressure regulator, adjust the water pressure on the first pressure gauge to no more than 30 psi.



Flush the sampling apparatus with 20 gallons/ 76 liters of water by allowing the water to flow through the system and out the effluent hose.

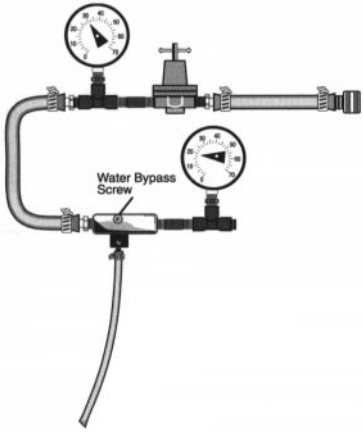
While the water is flushing the sampling apparatus, begin completing your sample label. Record the following information:

- Sampler's name
- Date
- Sample location

Stop Time: _____	Meter Reading: _____	Turbidity: _____
Start Time: _____	Meter Reading: _____	Turbidity: _____
Operator Name: _____	Total Volume Filtered: _____	
Date: _____	Sampling Location: _____	

STEP 6 Now, you must adjust the thiosulf injector.

First, using the water bypass screw, the larger top screw in the injector, adjust the pressure on the downstream pressure gauge to be at least 35% less than the pressure shown on the upstream gauge. For ample, if the upstream gauge reads 30 then the second gauge should read no m than 19psi.



Pour the 2% sodium thiosulfate solution into a graduated cylinder. Place the injector tube in the thiosulfate solution, and adjust the smaller injector screw, located on the bottom of the injector, so that the flow rate of the 2% thiosulfate solution is approximately 10 milliliters per minute.

If there is no suction visibly drawing down the thiosulfate solution, or if too much is flowing, adjust the water bypass screw further to increase or decrease the pressure differential between the two gauges. A greater differential between the upstream and downstream gauges increases the flow rate; a smaller differential decreases the flow rate.

After the thiosulfate flow rate is adjusted properly, transfer the injector tube to a carboy of thiosulfate. You will need to monitor this rate visually throughout sampling to ensure that an adequate amount of thiosulfate is being added to neutralize all of the disinfectants.

Turn off the water at the tap and empty the water in the filter housing.

Open the filter packaging as aseptically as possible and carefully drop the filter into the filter housing.

Hold the loose gasket in place.

Reassemble the filter housing, and reconnect the inlet and outlet hoses.

Slowly, start the water flowing through the sampling apparatus.

Using the pressure regulator, adjust the pressure on the upstream pressure gauge to no more than 30 psi. Using the water bypass screw, readjust the downstream pressure gauge to read 35% less than the upstream gauge, if necessary.

Record the following information on the sample label:

- Time sampling started
- Initial water meter reading (including units)
- Turbidity

Stop Time: _____	Meter Reading: _____	Turbidity: _____
Start Time: _____	Meter Reading: _____	Turbidity: _____
Operator Name: _____	Total Volume Filtered: _____	
Date: _____	Sampling Location: _____	

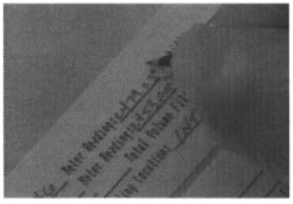
Place the filter housing in an upright position.

Monitor the water meter to ensure that the flow rate does not exceed 1 gallon/min (approximately 4 liters/min).

STEP 8 Allow at least 264 gallons/1000 liters of water to pass through the filter. At a flow rate of approximately 1 gallon/minute, this will require about 4 hours and 45 minutes.

Sampling Step	Volume In GALLONS	Volume In LITERS	Volume In FT^3
Protozoa Flow Rate	1 per minute	4 per minute	.13 per minute
Protozoa Finished Water Sample	264	1000	36

STEP 9 When the water meter indicates that 264 gallons/1000 liters of water have passed through the filter, turn off the water at the tap.



Record the following information on the sample label:

- Time sampling stopped
- Final water meter reading (including units)
- Final turbidity
- Total volume filtered

Stop Time:_____ Meter Reading:_____ Turbidity:_____
Start Time:_____ Meter Reading:_____ Turbidity:_____
Operator Name:_____ Total Volume Filtered:_____
Date:_____ Sampling Location:_____

STEP 10 Disconnect the sampling apparatus from the water tap.

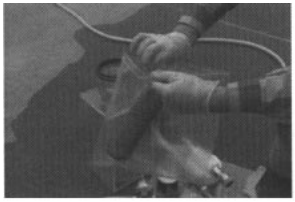
! Be sure to hold the inlet hose *above the level of the outlet hose opening* while the water drains from the housing. This will pre-

vent backwash and loss of particulate matter from the filter.

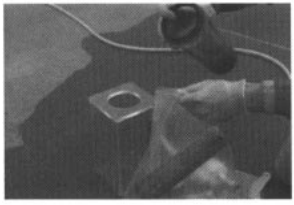
Disconnect the inlet and outlet hoses from the filter housing.

Put on fresh latex gloves.

11 As aseptically as possible, remove the filter from the housing and put it into a plastic sample bag.



12 Pour all of the water remaining in the filter housing into the same plastic bag.

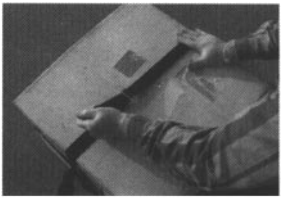


13 Seal the plastic sample bag and place it inside the second plastic sample bag.

Transfer the label or label information to the outside of the outer bag.

14 Put the bags containing the filter into the shipping container.

Place the ice packs around, but not on, the sample bag to prevent freezing the sample. You may want to insert several inflated, empty sample bags between the sample and the ice packs.



15 Seal the container and follow the laboratory's instructions related to the cleaning, storage, and return of sampling equipment.

16 Ship the container by overnight courier to the laboratory.

Call the laboratory and notify them of the sample shipment.